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10/798,402

03/12/2004

Nobutaka Kitagawa

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03/26/2007

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.

1940 DUKE STREET

ALEXANDRIA, VA 22314

EXAMINER

ROMAN, LUIS ENRIQUE

ART UNIT

PAPER NUMBER

2836

| SHORTENED STATUTORY PERIOD OF RESPONSE | NOTIFICATION DATE | DELIVERY MODE |
|--|-------------------|---------------|
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3 MONTHS

03/26/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/26/2007.

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**Office Action Summary**

Application No.

10/798,402

Applicant(s)

KITAGAWA, NOBUTAKA

Examiner

Luis Roman

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2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

Applicant amendment filed on 12/22/06 has been entered. Accordingly claims 2-6, 8-11 & 14-20 have been kept original, claims 1, 7 & 13 have been amended and no claims have been cancelled or added. It also included remarks/arguments.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-20** are rejected under 35 U.S.C. §103(a) as being unpatentable over Ito et al. (US 6683767) in view of Ker et al. (US 5637900), English et al. (US 5745323) and Hiraga Noriaki (JP 2001-044364).

Regarding claims 1-6 Ito et al. discloses a semiconductor integrated circuit (Fig. 1 element 10) comprising: an inner circuit (Fig. 1 element 2) driven by a single power voltage (Fig. 1 element L20<Vext>); and protective circuits (Col. 2 lines 15-16 & Fig. 1 element 2).

Ito et al. does not specifically disclose a first protective circuit which protects the inner circuit from a surge, wherein the inner circuit includes: a high voltage-proof circuit section constituted of a first MOS transistor; a low voltage-proof circuit section constituted of second MOS transistor including gate insulating film thinner than that of

the first MOS transistor; and a second protective circuit directly connected to the low voltage-proof circuit section to protect the second MOS transistor from the surge.

Ker et al. discloses an ESD protection circuitry wherein the inner circuit includes: a high voltage-proof circuit section constituted of a first MOS transistor (Fig. 6 element P3); a low voltage-proof circuit section constituted of second MOS transistor including gate insulating film thinner than that of the first MOS transistor (Fig. 6 element P1); and a second protective circuit directly connected to the low voltage-proof circuit section to protect the second MOS transistor from the surge (Fig. 6 elements P4, P5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Ito et al. device with the Ker et al. teachings because it will provide a protection from four different ESD stress modes by providing more discharging paths (Ker et al. <Abstract>).

Ito et al. in view of Ker et al. does not disclose a first protective circuit, which protects the inner circuit from a surge.

English et al. teaches a thick oxide MOS protecting another thick oxide MOS (Fig. 6 elements 122, 232).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Ito et al. in view of Ker et al. device with the English et al. teachings because it provides an enhance ESD protection to the circuit (English et al. <Col.1 lines 54-61>).

Ito et al. further discloses wherein a low voltage-proof circuit section is driven by an inner power voltage, which is obtained by stepping down the single power voltage (Col. 2 lines 16-25).

Ker et al. further discloses wherein the second MOS transistor is a device, which directly receives the inner power voltage (Fig. 6 elements P1, VDD).

Ker et al. further discloses wherein the second MOS transistor is a device which directly receives data from the high voltage-proof circuit section (Fig. 6 elements P1 getting data from path 155 thru gate 145).

Ker et al. further discloses wherein the second protective circuit constituted of a diode or diode-connected MOS transistor, and a clamp voltage by the diode or the diode-

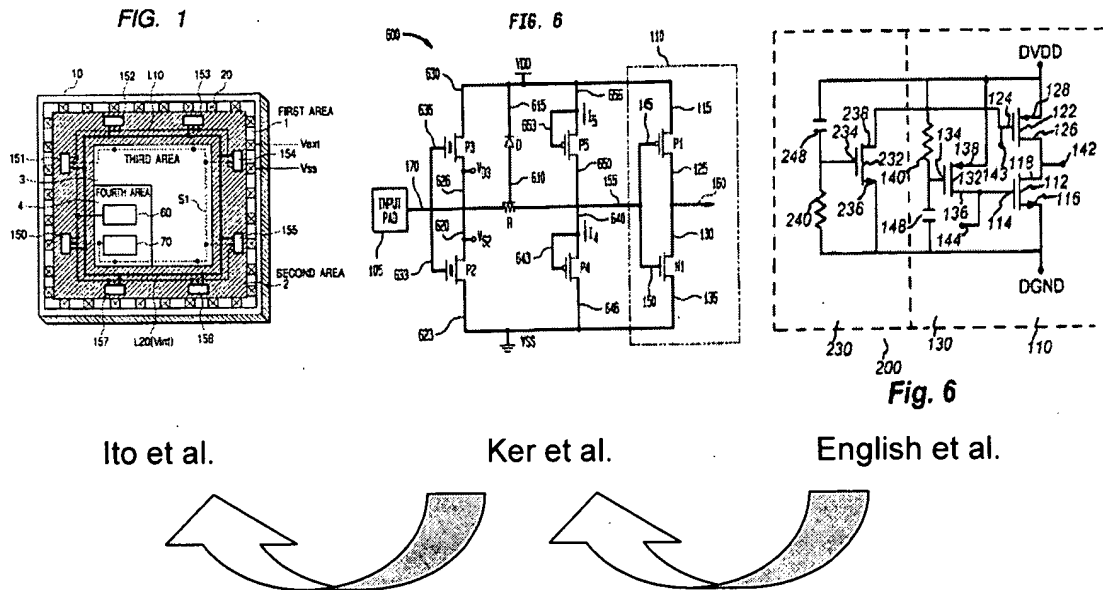
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connected MOS transistor is larger than a maximum value of a voltage range at the time of a usual operation in the low voltage-proof circuit section (Col. 8 lines 5-33).

Ito et al. in view of Ker et al. and English et al. does not specifically disclose wherein the data is transferred from the first protective circuit to the second protective circuit.

Hiraga Noriaki teaches a semiconductor integrated circuit in which data flows from one protective circuit to another (Abstract & Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Ito et al. in view of Ker et al. and English et al. device with the Hiraga Noriaki teachings because it reinforces protection of an inner circuit from ESD (Hiraga Noriaki<Problem To Be Solved>).



proof circuit section constituted of a second MOS transistor including a gate insulating film thinner than that of the first MOS transistor (Ker et al. <Fig. 6 element P1>); and a second protective circuit directly connected to the low voltage-proof circuit section to protect the second MOS transistor from the surge (Ker et al. <Fig. 6 elements P4, P5>). Ito et al. further discloses wherein the low voltage-proof circuit section is driven by an inner power voltage obtained by stepping down the single power voltage (Col. 2 lines 16-25).

Ker et al. further discloses wherein the second MOS transistor is a device, which directly receives the inner power voltage (Fig. 6 elements P1, VDD).

Ker et al. further discloses wherein the second MOS transistor is a device, which directly receives data from the high voltage-proof circuit section (Fig. 6 elements P1 getting data from path 155 thru gate 145).

Ker et al. and English et al. further discloses wherein the low voltage-proof circuit section exchanges data (Ker et al. <Fig. 6 elements P1, path 155>) with respect to the high voltage-proof circuit section (English et al. <Fig. 6 elements 122, path 142>).

Ker et al. further discloses wherein the second protective circuit is the high constituted of a diode or a diode-connected MOS transistor, and a clamp voltage by the diode or the diode-connected MOS transistor is larger than a maximum value of a voltage range at the time of a usual operation in the low voltage-proof circuit section (Col. 8 lines 5-33).

Ito et al. in view of Ker et al. and English et al. does not specifically disclose wherein the data is transferred from the first protective circuit to the second protective circuit.

Hiraga Noriaki teaches a semiconductor integrated circuit in which data flows from one protective circuit to another (Abstract & Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Ito et al. in view of Ker et al. and English et al. device with the Hiraga Noriaki teachings because it reinforces protection of an inner circuit from ESD (Hiraga Noriaki <Problem To Be Solved>).

Regarding claims 13-20 Ito et al. in view of Ker et al. and English et al. discloses a semiconductor integrated circuit (Ito et al. <Fig. 1 element 2>) comprising: a first inner circuit constituted of a first MOS transistor and driven by a first power voltage (English et al. <Fig. 6 element 122>); a second inner circuit constituted of a second MOS transistor including a gate insulating film thinner than that of the first MOS transistor (Ker et al. <Fig. 6 element P1>) driven by a second power voltage lower than the first power voltage to exchange data with respect to the first inner circuit (Ito et al. <Col. 2 lines 16-25>); a first protective circuit directly connected to the first inner circuit to protect the first MOS transistor from a surge (English et al. <Fig. 6 element 232>); and a second protective circuit directly connected to the second inner circuit to protect the second MOS transistor from the surge (Ker et al. <Fig. 6 elements P4, P51>).

Ker et al. further discloses wherein the second MOS transistor is a device which directly receives the second power voltage (Fig. 6 elements P1, VDD).

Ker et al. further discloses wherein the second MOS transistor is a device which directly participates in the exchange of the data (Fig. 6 elements P1 getting data from path 155 thru gate 145).

Ker et al. further discloses wherein the second protective circuit is directly connected to the second MOS transistor (Fig. 6 elements P1, P4, P5).

English et al. teaches an ESD complementary protection with a resistor and a capacitor, which clamps the surge with a time constant smaller than a transition time of a signal to effectively operate (Col. 6 lines 2-19 & Fig. 6 elements 240, 248).

Ker et al. further discloses wherein the second protective circuit is constituted of a diode or a diode-connected MOS transistor, and a clamp voltage by the diode or the diode-connected MOS transistor is larger than a maximum value of a voltage range at the time of a usual operation in the second inner circuit (Col. 8 lines 5-33).

Ker et al. further discloses wherein the second protective circuit is constituted of an analog switch (Fig. 6 element P5).

English et al. discloses wherein the first protective circuit is directly connected to an external terminal (Fig. 6 elements 132, VDD), and the second protective circuit (Ker et al. <Fig. 6 elements P4, P5>) is not directly connected to the external terminal (Ito et

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al.<implicitly disclosed since there is a step-down device between the two protective circuits - Col. 2 lines 16-25>).

Ito et al. in view of Ker et al. and English et al. does not specifically disclose wherein the data is transferred from the first protective circuit to the second protective circuit.

Hiraga Noriaki teaches a semiconductor integrated circuit in which data flows from one protective circuit to another (Abstract & Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Ito et al. in view of Ker et al. and English et al. device with the Hiraga Noriaki teachings because it reinforces protection of an inner circuit from ESD (Hiraga Noriaki<Problem To Be Solved>).

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.



**Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

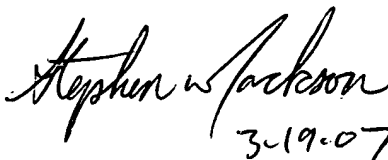
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis E. Román whose telephone number is 571-272-5527. The examiner can normally be reached on Mon – Fri from 7:15 AM to 3:45 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system.

Status information for unpublished applications is available through private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LR/031707

  
3-19-07

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PATENT EXAMINER

Luis E. Román  
Patent Examiner  
Art Unit 2836